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# (54) Improved tape dispenser.

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## Description

### Field of the Invention

The present invention relates to automatic tape dispensing systems, and more particularly to apparatuses for splicing and tensioning tapes in such systems.

### Background and Summary of the Invention

Modern consumer and industrial packaging often includes reinforcing tapes or tear tapes as part of their construction. Various tape dispensers have been devised to dispense such tapes into corrugator and packaging equipment. However, all have certain drawbacks.

One of the principal drawbacks of the prior art systems is in their techniques for changing from one spool of tape to another when the first spool becomes depleted. Many systems require that the packaging line be halted while a new spool of tape is installed and threaded through the appropriate tape guides. This interruption is intolerable in complex packaging lines which rely, for their cost effectiveness, on continuous, uninterrupted operation.

To partially alleviate the interruption problem, some tape dispensing systems rely on a human operator to stand at the ready and manually splice the tapes together. The operator loops the leading end of a replacement spool of tape about the free running tape on the first spool. When the first spool is nearly depleted, the corrugator or packaging equipment is slowed to about one third of its normal speed and the operator cinches the loop onto the free running tape to form a splice knot. At the same instant he manually spins the second spool to overcome its static inertia so that the machine can draw tape therefrom.

This approach, although an improvement, has several problems. One is that it requires a skilled operator to monitor the tape spools and be ready to tie the splicing knot at the critical instant. Another problem is that it requires the packaging equipment be slowed from its usual speed. Still another problem is that, even if the splice is successfully made (and often it is not), the operator's manual acceleration of the second spool may not be sufficient to prevent the tape from breaking when the packaging line suddenly starts pulling several hundred of feet of tape per minute from the spool. A tape break, of course, requires that the packaging line be stopped, the very problem that was sought to be avoided. Yet another problem is that some slack may be momentarily introduced into the second tape by the operator's manual spinning of the spool. This slack permits the tape to change its orientation and may result, for example, in an adhesive tape being applied to the packaging wrong side down.

Accordingly, a need remains for an improved technique for splicing from one spool of tape to another in an automatic packaging line so that the packaging line can reliably operate without interruption.

It is an object of the present invention to fulfil this need.

According to one aspect of the present invention there is provided a tape dispensing apparatus, comprising:

first and second spools of tape, the tape on each of said spools having a leading end and a trailing end; and

an element on or near the trailing end of the first tape that cooperates with an element on the leading end of the second tape to make said second spool of tape self splicing to the first so that when the first spool becomes depleted of tape, the second spool can begin immediately dispensing tape in its stead.

According to another aspect of the invention, there is provided a method of dispensing reinforcing or tear tape, characterised by the steps of:

providing a roll of a first tape having on or near a trailing end thereof an obstacle extending thereacross;

providing a roll of a second tape having on a leading end thereof a string extending thereacross, said string having first and second ends;

dispensing tape from the first roll and while so doing, tying the two ends of the string together to form a closed loop around the first tape;

wherein when the first roll of tape is exhausted, the loop tied around the first tape will catch the obstacle extending thereacross, thereby linking the trailing end of the first tape to the leading end of the second tape and causing tape to be dispensed from the second roll.

According to a further aspect of the invention, there is provided a spool of reinforcing or tear tape from which tape can be dispensed, comprising a rolled length of tape having on a leading end thereof means for forming a loop and having on or near a trailing end thereof an obstacle extending across and beyond the width of the tape.

In a preferred embodiment, one tape is provided near its trailing end with a pin extending thereacross. The second tape is provided at its leading end with a loop sized so that the pin cannot pass therethrough. When the pin engages the loop, the tapes become linked, causing the trailing end of the first tape to pull the leading end of the second tape into the packaging equipment.

The second spool of tape may be stationary when the splice is made. To prevent the tape from breaking under the strain of instantaneous acceleration, the tape path is provided with a movable roller guide. In one embodiment, this roller guide moves against the force of a spring and acts to shorten the tape path

when the tension in the tape increases. The shortened tape path provides the packaging equipment with the tape it needs without requiring the second spool to contemporaneously dispense a corresponding length. As the new spool of tape comes up to speed, the movable roller returns under the influence of the spring to its initial position. An active brake assembly prevents the spool from unduly accelerating in response to this spring-driven lengthening of the tape path by the movable roller. Thus, the tension and orientation of the tapes are controlled during a splicing operation so that the spliced tape is not broken nor applied with the wrong orientation.

An embodiment of the present invention is described below by way of example, with reference to the accompanying drawings, wherein:-

Figure 1 is an illustration showing the splice formed by cooperation between a pin on the trailing end of a first tape with a loop on the leading end of a second tape.

Fig. 2 is an illustration showing how the pin component is affixed to the tape end.

Fig. 3 is an illustration showing a detachable tail on the trailing end of the first tape to maintain proper orientation of the splice.

Fig. 4 is a front view of a tape dispensing apparatus employing the tension control system of the present invention.

Fig. 5 is a section taken on line 5-5 of Fig. 4.

Fig. 6 is a view taken on line 6-6 of Fig. 5.

Fig. 7 is a section taken on line 7-7 of Fig. 4.

Fig. 8 is a view taken on line 8-8 of Fig. 7.

Fig. 9 shows a brake band assembly used with the tension control system of Fig. 4.

Fig. 10 shows a lever used with the tension control system of Fig. 4.

Fig. 11 shows a brake band bracket used with the tension control system of Fig. 4.

Fig. 12 is a view showing portion of the tension control system of Fig. 4.

Fig. 13 is a view showing another portion of the tension control system of Fig. 4.

Fig. 14 is a view showing the brake band and the spindles in the tension control system of Fig. 4.

Fig. 15 is another view showing the brake band and the spindles in the tension control system of Fig. 4.

Fig. 16 is a schematic illustration of the tension control system of Fig. 4.

## Detailed Description

Referring first to Fig. 1, each tape is provided with end elements which cooperate with end elements on other tapes to make the tapes self- splicing. In Fig. 1, a first tape 12 is provided at its trailing end 14 with a pin end element 16. A second tape 18 is provided at its leading end 20 with a loop element 22. When the pin 16 engages the loop 22, the tapes become linked, causing the trailing end of the first tape to pull the leading end of the second tape into the machine.

End elements 16 and 22 can be attached to the tapes in a variety of ways. Illustrated in Fig. 2 is a technique applicable with adhesive tapes, such as hot melt tapes, wherein the end element (here a pin 16) is placed on the tape and the tape looped back and adhered to itself. The loop element is affixed similarly.

Fig. 3 shows the relationship of the two tapes just before the first spool of tape 24 becomes depleted. It will be recognized that some means must be provided for positioning loop 22 around the first tape 12. In the illustrated embodiment, this is achieved by forming end element 16 of reinforced string and tying it in a loop around the first tape. Other techniques could, of course, be used.

When the trailing end 14 of tape 12 comes off spool 24, it would normally be free to twist and turn. Such movement, however, may result in the tape being introduced into the machine wrong side down. The second tape that followed it would likewise be misoriented. To avoid this problem, the trailing end of the first tape 12 is desirably provided with a tail segment 26 affixed to the spool. The tail segment 26 has a length sufficient so that the second tape is linked to the trailing end of the first tape, in the proper orientation, before the end of the tail segment is reached.

In the embodiment shown in Fig. 3, the tail segment 26 is detachably connected to the trailing end of the first tape 12 by means such as masking tape 27. The other end of the tail segment is securely affixed to the spool 24. When the first tape draws the tail segment tight, the masking tape joint is pulled free, leaving the tail segment dangling from the spool and leaving the pin/loop splice free to travel into the machine.

In other embodiments, the tail segment need not be detachable as shown. Instead, it can be securely affixed to the first tape and not connected to the spool. When the end of the tail segment comes free of the spool, it is introduced into the machine and applied just as with any other tape.

Referring now to Figs. 4-16, a dispensing apparatus 30 with which the above splicing technique can be employed comprises a frame 32 on which are mounted two spools 24, 34 of tape. Tape is routed from one of these spools over a fixed roller 36 and down to a tensioning roller 38. Tensioning roller 38 is mounted on a block 40 that rides on slider rods 42. The block 40 is pulled downwardly by a spring 44 and upwardly by tension in the tape. (In the illustrated embodiment, the spring 44 is a rubber hose, as is visible in Fig. 12. In other embodiments, other mechanisms could of course be used, such as a hydraulic cylinder, etc.) The tape continues from tensioning roller 38 up over another fixed roller 46 and on into the corrugator equipment.

Referring now particularly to Fig. 16, it will be recognized that when the first spool 24 becomes depleted of tape, the above-described splicing technique will suddenly bring the second spool 34 (which had previously been stationary) into action. Since the second spool cannot immediately supply tape at the rate required by the corrugator (typically 600 feet per minute), the tension in the tape suddenly increases. The increased tension causes roller 38 to move upwardly against the force of spring 44. This movement serves to shorten the tape path, thereby providing tape to the corrugator without requiring the second spool to dispense a corresponding length contemporaneously.

After the second spool 34 accelerates to the required speed, the tension in the tape decreases. This permits the roller 38 to be pulled downwardly by spring 44. This movement, however, lengthens the tape path, momentarily pulling tape from the second spool at a rate greater than is required by the corrugator. This momentary oversupply of tape introduces slack into the system which diminishes the force pulling tape from spool 34, permitting it to slow down. When the slack is used up, the spool is no longer operating at the requisite speed and a tension spike occurs when the system again tries to draw tape from the spool faster than it is immediately able to supply it. This in turn causes the tensioning roller 38 to move upwardly against spring 44. The process repeats. The net result is a diminishing series of oscillations in the system, with the tape alternately going slack and too tight until equilibrium is finally established. During the slack intervals, the tape may become misoriented (i.e. wrong side down) or may even jump the rollers.

(Another way of conceptualizing this oscillation phenomenon is that spring 44 absorbs energy applied by the corrugator when the second spool is started and stores it as spring tension. After the second spool accelerates to full operating speed, the spring releases that stored energy back to the system. This released energy is absorbed by the second spool and is stored in the form of a rotational speed higher than is required by the system. This generates an oversupply of free tape so that the pulling force exerted by the corrugator is no longer applied to the spool. The spool slows while the slack is taken up. When the slack is exhausted, the corrugator again exerts a tension spike against the spool (unless the spool is at exactly the speed required by the corrugator). This new tension spike again introduces energy into spring 44 and the cycle repeats).

To overcome this problem, the apparatus 30 is provided with a dynamic brake assembly 50. Brake assembly 50 comprises a brake band 52 which extends about portions of the spindles 54, 56 on which the spools 24, 34 ride and acts to retard their rotation. The upper end 58 of the brake band 52 is stationary, affixed to the frame 32. The lower end 60 is connected to a spring 62 which is connected at its other end to the frame 32. The spring 62 tensions the brake band 52 and establishes a quiescent braking force on spools 24 and 34. As discussed below, the apparatus is provided with means for changing this braking force in response to changes in tape tension.

When tape tension is low (i.e when the spool is providing tape faster than is required by the corrugator), it is desirable to apply an increased braking force to the spool to retard its dispensing of tape. Conversely, when the tape tension is high, it is desirable to apply a decreased braking force so that the dispensing of tape can be accelerated.

In the illustrated embodiment, one physical indicator of tape tension is the position of tensioning roller 38. When tape tension is high, the roller is elevated. When tape tension is low, the roller assumes a lower position. This motion is advantageously used in the present invention to control the braking force applied to the spools.

As shown in Fig. 16, a lever 64 is pivotally mounted on the frame 32 and extends under the tensioning roller 38 and the braking assembly 50. When tape tension is high, spring 44 pulls upwardly on a first end 66 of the lever, causing the second end 68 of the lever to move downwardly. This movement is coupled to the brake assembly 50 by a member 70 which pulls against brake spring 62, thereby reducing the tension in the brake band and causes a corresponding reduction in the braking force. Conversely, when the tape tension is lowered, the first end 66 of the lever moves downwardly, moving the second end upwardly. This motion permits brake spring 62 to reapply more tensioning force to the brake band 52, thereby causing a corresponding increase in the braking force.

From the foregoing, it will be recognized that the present invention employs a feedback mechanism that senses the tension in the tape and automatically adjusts the braking force in response thereto.

It will be noted that the brake band 52 extends 180 degrees about the lower spindle 56, but a lesser distance about the upper spindle 54. This reflects the fact that the weight of the brake band 52 hanging down from the upper spindle applies a tensioning force to the brake band on the upper spindle that is not present on the lower spindle. It is desirable that the braking forces applied to the two spindles be matched, although this is not a requirement of the invention.

Figs. 4-6 and 12-15 show a tape dispensing apparatus that incorporates six of the assemblies shown in Fig. 16.

Having described and illustrated the principles of our invention with reference to a preferred embodiment, it will be apparent to those having skill in the art that the invention can be modified in arrangement and detail without departing from such principles. For

example, while a braking assembly has been shown for quickly dampening undesirable oscillations in the system, in other embodiments, a variety of other techniques can be used to absorb the excess energy. In still other embodiments, the replacement spool is accelerated in response to electrical or mechanical sensors that indicate that the initial spool is about to be depleted.

In view of these and the wide range of other embodiments to which the concepts of the present invention can be applied, it should be recognized that the foregoing description is illustrative only and is not to be construed as limiting the scope of the invention. Instead, we claim as our invention all such modifications as may come within the scope of the following claims and equivalents thereof.

The features disclosed in the foregoing description, in the following claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

## Claims

1. A tape dispensing apparatus, comprising:

first and second spools of tape, (24, 34) the tape on each of said spools having a leading end and a trailing end; and

an element (16) on or near the trailing end (14) of the first tape (12) that cooperates with an element (22) on the leading end (20) of the second tape (18) to make said second spool of tape self splicing to the first so that when the first spool becomes depleted of tape, the second spool can begin immediately dispensing tape in its stead.

2. The apparatus of claim 1 in which the element on the trailing end of the first tape comprises an obstacle; and

the element on the leading end of the second tape defines a passageway through which the obstacle cannot pass.

3. The apparatus of claim 1 in which:

the element on the trailing end of the first tape (12) comprises a pin (16) extending transversely across the tape, the pin having a length longer than the width of the tape; and

the element on the leading end of the second tape (18) comprises means (22) for forming a loop around the first tape in which the pin can engage.

4. The apparatus of claim 1 which further includes brake means (50) responsive to the tension in the tape being dispensed for applying a variable braking force to said spools.

5. The apparatus of claim 4 in which:

the brake means includes a movable control member (70) for controlling the braking force applied to the spools;

the dispensing apparatus includes;

a tape guide member (38, 40) movable in response to tension in the tape being dispensed; and

a mechanical linkage (44, 64) coupled to the movable guide member (38, 40) and to the movable control member (70) for controlling the braking force in response to the position of the guide member.

6. The apparatus of claim 5 in which the mechanical linkage comprises a pivoted lever (64).

7. The apparatus of claim 1 which further comprises means for preventing the spliced tape from changing its orientation during a transition from the first spool to the second.

8. The apparatus of claim 7 in which the trailing end (14) of the first tape (12) is coupled to a tail portion (26) wrapped about the first spool (24), whereby said trailing end (14) is not free when it is dispensed from the spool (24).

9. The apparatus of claim 8 in which the tail portion (26) is securely affixed to the first spool (24) and less securely affixed to the trailing end (12), whereby the trailing end (12) will separate from the spool at the junction between the trailing end (12) and the tail portion (26).

10. The apparatus of claim 1 which further comprises means for preventing the spliced tape from going slack during a transition from the first spool to the second.

11. A method of dispensing reinforcing or tear tape, characterised by the steps of:

providing a roll of a first tape (12) having on or near a trailing end (14) thereof an obstacle (16) extending thereacross;

providing a roll of a second tape (18) having on a leading end (20) thereof a string (22) extending thereacross, said string having first and second ends;

dispensing tape from the first roll and while so doing, tying the two ends of the string (22) together to form a closed loop around the first tape (12);

wherein when the first roll of tape is exhausted, the loop (220) tied around the first tape will catch the obstacle (16) extending thereacross, thereby linking the trailing end of the first tape to the leading end of the second tape and causing tape to be dispensed from the second roll.

12. The method of claim 11 which further includes reducing the tension suddenly applied to tape on the second roll when the tape begins being dispensed therefrom.

13. The method of claim 12 in which the reducing step includes rotationally accelerating the second roll before tape begins being dispensed therefrom.

14. The method of claim 12 in which the reducing step includes changing the length of a path traversed by the tape in response to increased tension therein.

15. A spool of reinforcing or tear tape from which tape can be dispensed, comprising a rolled length of tape having on a leading end (20) thereof means (22)

for forming a loop and having on or near a trailing end (14) thereof an obstacle (16) extending across and beyond the width of the tape.

16. A spool of reinforcing or tear tape, said tape having affixed to a leading end (20) thereof a length of string (22) with first and second ends, wherein said ends can be tied together to form a loop which may be used to link said leading end to the trailing end (14) of another spool of tape.

17. A spool of tape according to claim 16 in which the leading end of the tape is folded back over the string (22) and adhered to itself, thereby securing the string to the leading end of the tape.

18. A spool of reinforcing or tear tape, said tape having affixed to a trailing end thereof an obstacle (16) extending across and beyond the width of the tape, the trailing end of the tape being folded back over the obstacle (16) to adhere to itself, thereby securing the obstacle to the trailing end of the tape.

**Patentansprüche**

1. Bandspendegerät, das umfaßt:

erste und zweite Spulen Band (24, 34), wobei das Band auf jeder der Spulen ein führendes Ende und ein hinteres Ende hat; und

ein Element (16) an oder nahe dem hinteren Ende (14) des ersten Bandes (12), das mit einem Element (22) auf dem führenden Ende (20) des zweiten Bandes (18) zusammenwirkt, um die zweite Spule Band selbstspleißend im Hinblick auf die erste zu machen, so daß dann, wenn die erste Spule mit Band erschöpft wird, die zweite Spule sofort beginnen kann, an ihrer Stelle Band zu spenden.

2. Gerät nach Anspruch 1, bei dem das Element auf dem hinteren Ende des ersten Bandes ein Hindernis umfaßt; und

das Element auf dem führenden Ende des zweiten Bandes einen Durchgang festlegt, durch den das Hindernis nicht hindurch kann.

3. Gerät nach Anspruch 1, bei dem:

das Element auf dem hinteren Ende des ersten Bandes (12) einen Stift (16) umfaßt, der sich quer über das Band erstreckt, wobei der Stift eine Länge hat, die größer als die Breite des Bandes ist; und

das Element auf dem führenden Ende des zureiten Bandes (18) eine Einrichtung (22) zum Ausbilden einer Schleife um das erste Band herum umfaßt, in welche der Stift eingreifen kann.

4. Gerät nach Anspruch 1, das ferner eine Bremseinrichtung (50) umfaßt, die entsprechend der Spannung in dem gespendeten Band eine variable Bremskraft auf die Spulen ausübt.

5. Gerät nach Anspruch 4, bei dem:

die Bremseinrichtung ein bewegliches Steuerelement (70) zum Steuern der auf die Spulen wirkenden Bremskraft umfaßt;

das Spendegerät umfaßt:

ein Bandführungselement (38, 40), das entsprechend der Spannung in dem gespendeten Band beweglich ist; und

eine mechanische Anlenkung (44, 64), die mit dem beweglichen Führungselement (38, 40) und dem beweglichen Steuerelement (70) verbunden ist, zum Regeln der Bremskraft entsprechend der Position des Führungselements.

6. Gerät nach Anspruch 5, bei dem die mechanische Anlenkung einen schwenkbaren Hebel (64) umfaßt.

7. Gerät nach Anspruch 1, das ferner eine Einrichtung umfaßt, zum Verhindern, daß das gespleißte Band seine Orientierung während eines Übergangs von der ersten Spule auf die zweite Spule ändert.

8. Gerät nach Anspruch 7, bei dem das hintere Ende (14) des ersten Bandes (12) mit einem Schwanzabschnitt (26), der um die erste Spule (24) geschlagen ist, verbunden ist, wodurch das hintere Ende (14) nicht frei ist, wenn es von der Spule (24) gespendet wird.

9. Gerät nach Anspruch 8, bei dem der Schwanzabschnitt (26) fest an der ersten Spule (24) befestigt ist und weniger fest an dem hinteren Ende (12) befestigt ist, wodurch das hintere Ende (12) von der Spule an der Verbindung zwischen dem hinteren Ende (12) und dem Schwanzabschnitt (26) auftrennen wird.

10. Gerät nach Anspruch 1, das ferner eine Einrichtung umfaßt, zum Verhindern, daß das gespleißte Band während eines Übergangs von der ersten Spule auf die zweite schlaff wird.

11. Verfahren zum Spenden von Verstärkungs- oder Reißband, gekennzeichnet durch folgende Schritte:

Bereitstellen einer Rolle eines ersten Bandes (12), das an oder nahe einem hinteren Ende (14) desselben ein Hindernis (16) umfaßt, das sich quer darüber erstreckt;

Bereitstellen einer Rolle eines zweiten Bandes (18), das an einem führenden Ende (20) desselben einen Faden (20) umfaßt, der sich quer darüber erstreckt, wobei der Faden erste und zweite Enden aufweist;

Spenden von Band von der ersten Rolle und währenddessen Knüpfen der beiden Enden des Fadens (22) zusammen, um eine geschlossene Schleife um das erste Band (12) zu bilden;

wobei dann, wenn die erste Rolle Band erschöpft ist, die Schleife (22), die um das erste Band herumgeknüpft ist, das Hindernis (16), welches sich quer dazu erstreckt, erfaßt, wodurch eine Verbindung des hinteren Endes des ersten Bandes mit dem führenden Ende des zweiten Bandes geschaffen ist und bewirkt wird, daß Band von der zweiten Rolle gespendet wird.

12. Verfahren nach Anspruch 11, das ferner das Senken derjenigen Spannung umfaßt, welche plötz-

lich auf das Band auf der zweiten Rolle wirkt, wenn das Band beginnt, davon gespendet zu werden.

13. Verfahren nach Anspruch 12, bei dem der Schritt des Absenkens drehmäßiges Beschleunigen der zweiten Rolle umfaßt, und zwar bevor das Band beginnt, davon gespendet zu werden.

14. Verfahren nach Anspruch 12, bei dem der Schritt des Absenkens das Verändern der Länge des von dem Band zurückgelegten Weges entsprechend der gesteigerten Spannung darin umfaßt.

15. Spule Verstärkungs- oder Reißband, von der Band gespendet werden kann, umfassend eine aufgerollte Länge Band, das an einem führenden Ende (20) desselben eine Einrichtung (22) zum Ausbilden einer Schleife umfaßt und an oder nahe dem hinteren Ende (14) desselben ein Hindernis (16) umfaßt, das sich darüber und über die Breite des Bandes hinaus erstreckt.

16. Spule Verstärkungs- oder Reißband, wobei das Band, befestigt an einem führenden Ende (20) desselben, eine Länge Faden (22) mit ersten und zweiten Enden umfaßt, wobei die Enden zusammengeknüpft werden können, um eine Schleife zu bilden, welche verwendet werden kann, um das führende Ende an das hintere Ende (14) einer anderen Spule Band anzulenken.

17. Spule Band nach Anspruch 16, bei der das führende Ende des Bandes über den Faden (22) zurückgefaltet und an sich selbst angeheftet ist, wodurch der Faden an dem führenden Ende des Bandes befestigt ist.

18. Spule Verstärkungs- oder Reißband, wobei das Band, befestigt an dem hinteren Ende desselben, ein Hindernis (16) umfaßt, das sich darüber und über die Breite des Bandes hinaus erstreckt, wobei das hintere Ende des Bandes über das Hindernis (16) zurückgefaltet ist, um an sich selbst anzuhaften, wodurch das Hindernis an dem hinteren Ende des Bandes befestigt ist.

## Revendications

1. Appareil de distribution de bande, comportant :

des première et deuxième bobines de bande (24, 34), la bande sur chacune desdites bobines ayant une extrémité avant et une extrémité arrière; et

un élément (16) situé sur l'extrémité arrière (14) de la première bande (12) ou à proximité de celle-ci, cet élément (16) coopèrant avec un élément (22) situé sur l'extrémité avant (20) de la deuxième bande (18) afin de permettre à ladite deuxième bobine de bande de se raccorder automatiquement à la première de telle sorte que lorsque la première bobine arrive à court de bande, la deuxième bobine peut commencer immédiatement à distribuer de la bande à sa place.

2. Appareil selon la revendication 1, dans lequel

l'élément situé sur l'extrémité arrière de la première bande comporte un obstacle; et

l'élément situé sur l'extrémité avant de la deuxième bande définit un passage à travers lequel l'obstacle ne peut pas passer.

3. Appareil selon la revendication 1, dans lequel :

l'élément situé sur l'extrémité arrière de la première bande (12) comporte un axe (16) s'étendant transversalement sur toute la largeur de la bande, l'axe ayant une longueur supérieure à la largeur de la bande; et

l'élément situé sur l'extrémité avant de la deuxième bande (18) comporte des moyens (22) destinés à former autour de la première bande une boucle dans laquelle l'axe peut faire prise.

4. Appareil selon la revendication 1, comportant en outre des moyens de freinage (50) sensibles à la tension dans la bande qui est distribuée afin d'appliquer une force de freinage variable sur lesdites bobines.

5. Appareil selon la revendication 4, dans lequel

les moyens de freinage comprennent un élément de commande mobile (70) destiné à commander la force de freinage appliquée sur les bobines;

l'appareil de distribution comprend :

un élément de guidage de bande (38, 40) mobile en réponse à la tension dans la bande qui est distribuée ; et

une liaison mécanique (44, 64) reliée à l'élément de guidage mobile (38, 40) et à l'élément de commande mobile (70) afin de commander la force de freinage en réponse à la position de l'élément de guidage.

6. Appareil selon la revendication 5, dans lequel la liaison mécanique comporte un levier (64) monté de façon pivotante.

7. Appareil selon la revendication 1, comportant en outre des moyens destinés à empêcher la bande raccordée de changer d'orientation pendant un passage de la première bobine à la deuxième.

8. Appareil selon la revendication 7, dans lequel l'extrémité arrière (14) de la première bande (12) est reliée à une partie de queue (26) enroulée autour de la première bobine (24), de sorte que l'extrémité arrière (14) n'est pas libre lorsqu'elle est séparée de la bobine (24).

9. Appareil selon la revendication 8, dans lequel la partie de queue (26) est fixée fermement à la première bobine (24) et est fixée moins fermement à l'extrémité arrière (12), de sorte que l'extrémité arrière (12) se sépare de la bobine à la jonction entre l'extrémité arrière (12) et la partie de queue (26).

10. Appareil selon la revendication 1, comportant en outre des moyens destinés à empêcher la bande raccordée de se détendre pendant un passage de la première bobine à la deuxième.

11. Procédé de distribution de bande de renforcement ou de bande de déchirage, caractérisé par les

étapes consistant à :

prévoir un rouleau d'une première bande (12) ayant sur son extrémité arrière (14) ou à proximité de celle-ci un obstacle (16) s'étendant sur toute la largeur de celle-ci ;

prévoir un rouleau d'une deuxième bande (18) ayant sur son extrémité avant (20) un fil (22) s'étendant sur toute la largeur de celle-ci, ledit fil ayant des première et deuxième extrémités;

distribuer de la bande du premier rouleau et, tout en procédant ainsi, attacher ensemble les deux extrémités du fil (22) de façon à former une boucle fermée autour de la première bande (12) ;

de sorte que, lorsque le premier rouleau de bande est vide, la boucle (22) attachée autour de la première bande saisit l'obstacle (16) s'étendant sur toute la largeur de celle-ci, en reliant ainsi l'extrémité arrière de la première bande à l'extrémité avant de la deuxième bande et provoquant la distribution de bande par le deuxième rouleau.

12. Procédé selon la revendication 11, comprenant en outre la réduction de la tension appliquée soudainement sur la bande située sur le deuxième rouleau lorsque la bande commence à être distribuée par celui-ci

13. Procédé selon la revendication 12, dans lequel l'étape de réduction comprend l'accélération de la rotation du deuxième rouleau avant que la bande commence à être distribuée par celui-ci.

14. Procédé selon la revendication 12, dans lequel l'étape de réduction comprend la modification de la longueur d'un trajet parcouru par la bande en réponse à la tension accrue de celle-ci.

15. Bobine de bande de renforcement ou de bande de déchirage à partir de laquelle peut être distribuée de la bande, comportant une longueur de bande enroulée ayant sur son extrémité avant (20) des moyens (22) destinés à former une boucle et ayant sur son extrémité arrière (14) ou à proximité de celle-ci un obstacle (16) s'étendant sur la totalité et au-delà de la largeur de la bande.

16. Bobine de bande de renforcement ou de bande de déchirage, ladite bande présentant, fixée sur son extrémité avant (20), une longueur de fil (22) avec des première et deuxième extrémités, dans laquelle lesdites extrémités peuvent être attachées ensemble afin de former une boucle qui peut être utilisée pour relier ladite extrémité avant à l'extrémité arrière (14) d'une autre bobine de bande.

17. Bobine de bande selon la revendication 16, dans laquelle l'extrémité avant de la bande est repliée par dessus le fil (22) et collée sur elle-même, en fixant ainsi le fil à l'extrémité avant de la bande.

18. Bobine de bande de renforcement ou de bande de déchirage, ladite bande présentant, fixée sur son extrémité arrière, un obstacle (16) s'étendant sur la totalité et au-delà de la largeur de la bande, l'extrémité arrière de la bande étant repliée par dessus l'obstacle (16) afin de se coller sur elle-même, en fixant ainsi l'obstacle à l'extrémité arrière de la bande.

FIG. 1

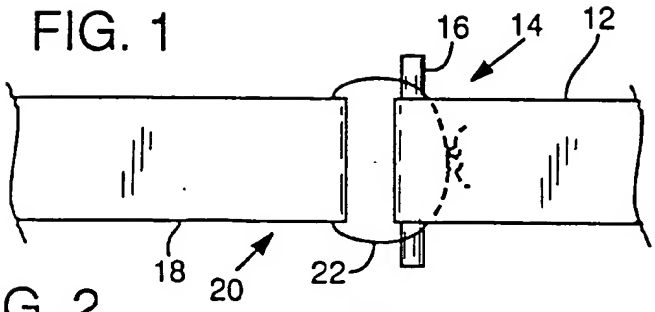



FIG. 2

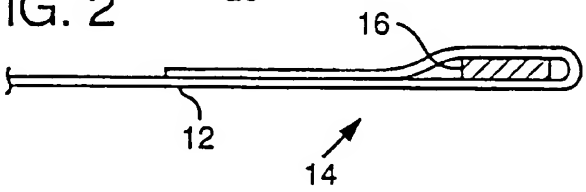
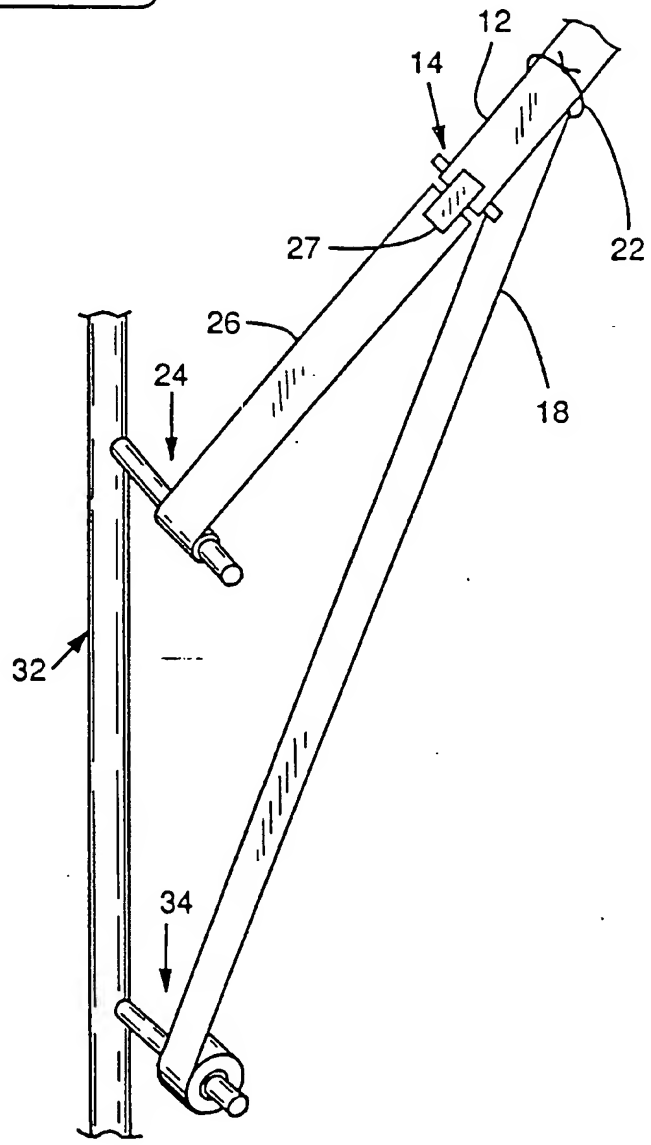



FIG. 3



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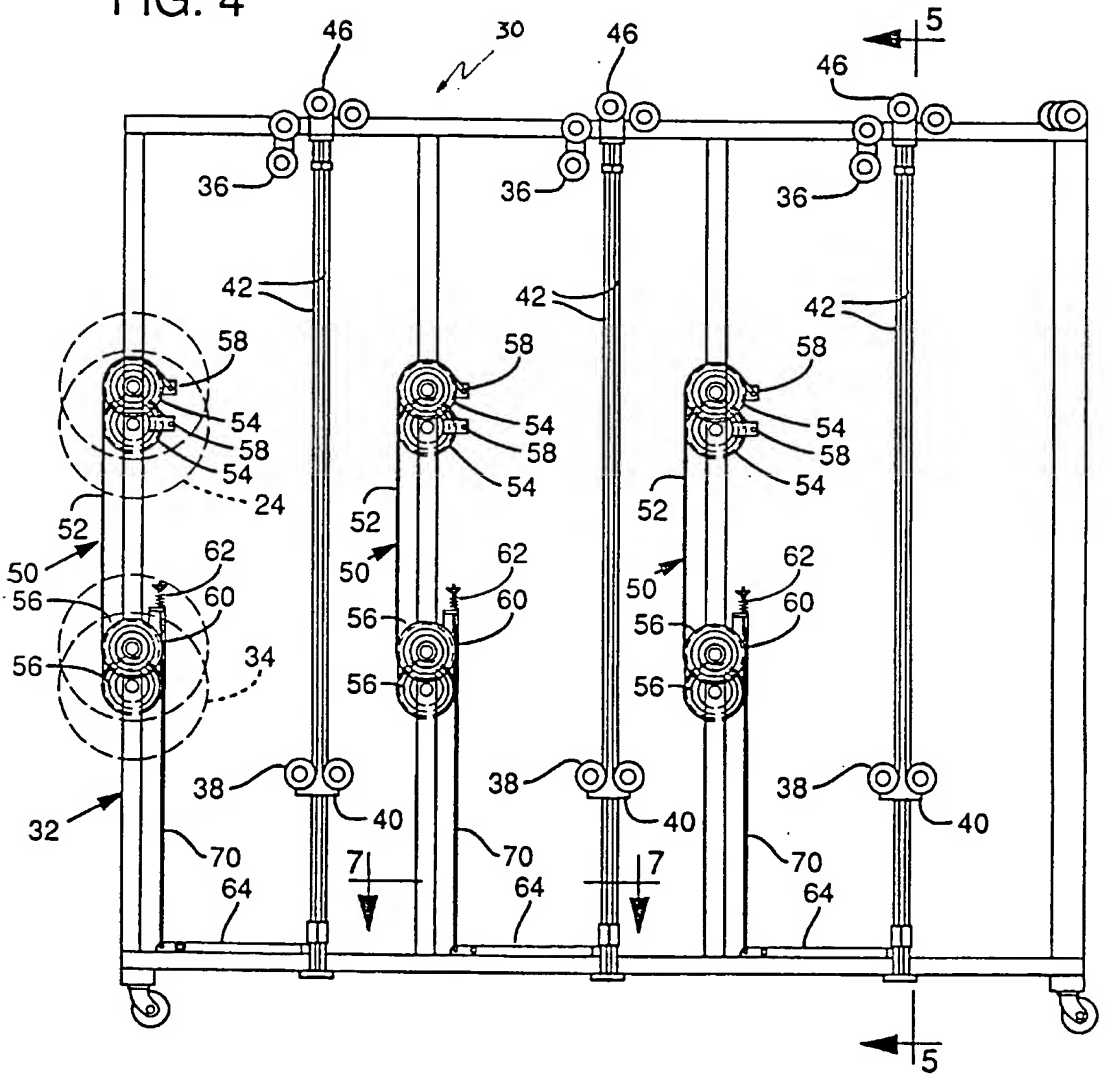
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FIG. 6

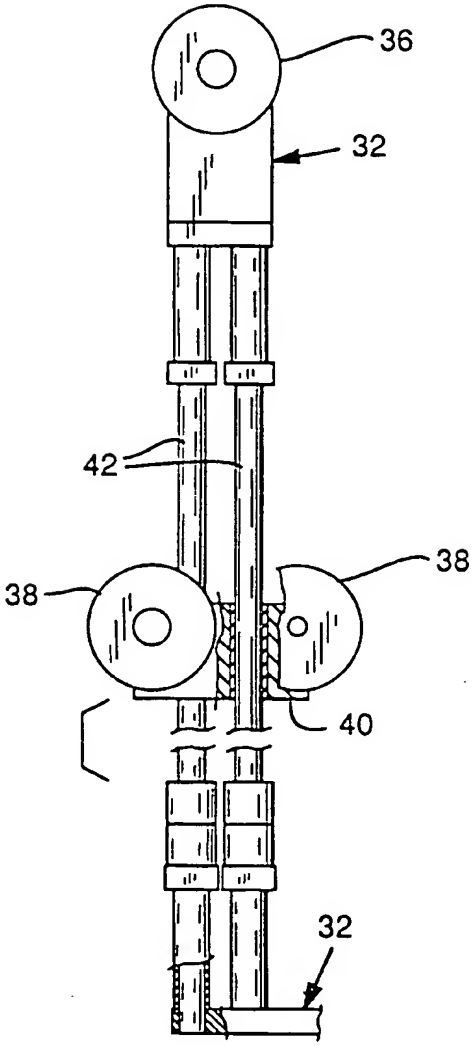


FIG. 5

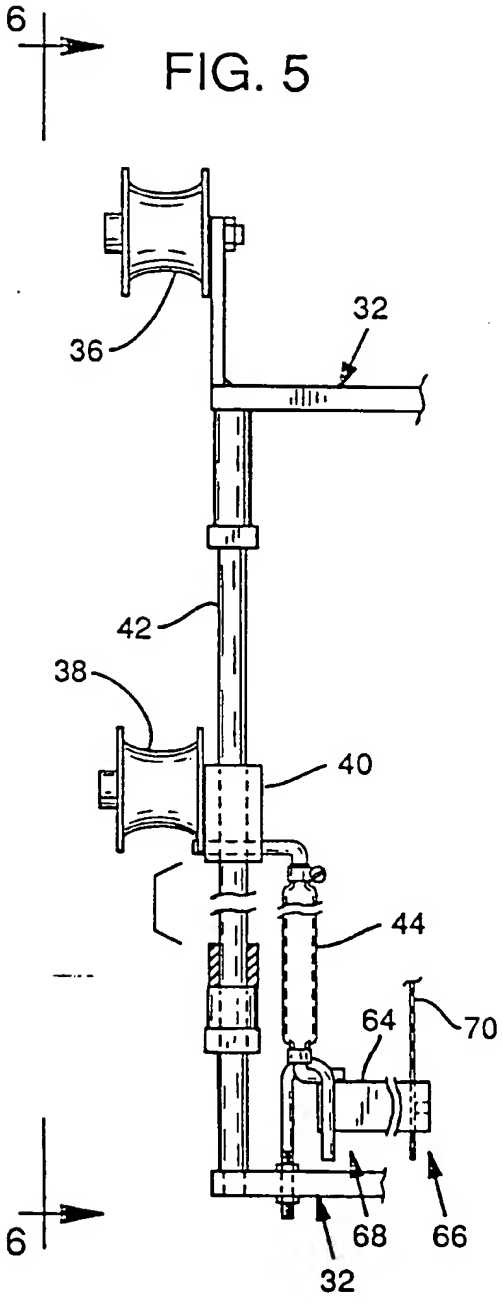

FIG. 7

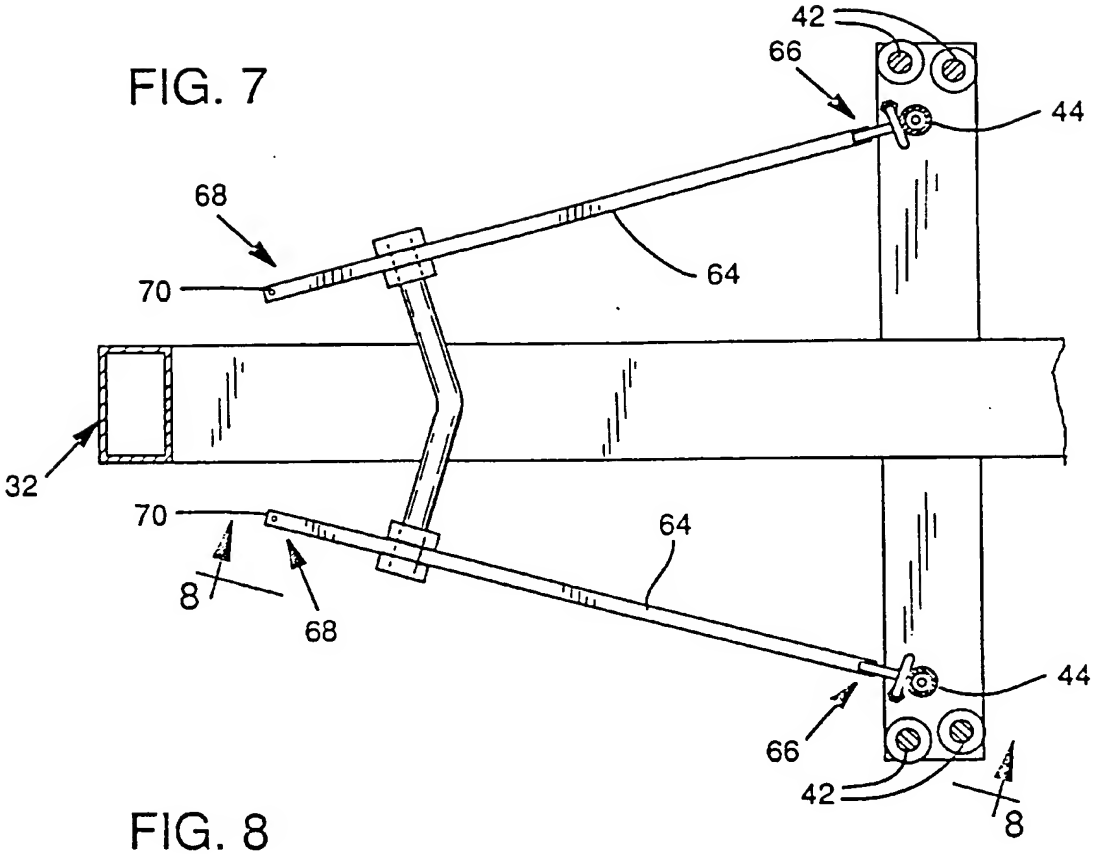


FIG. 8

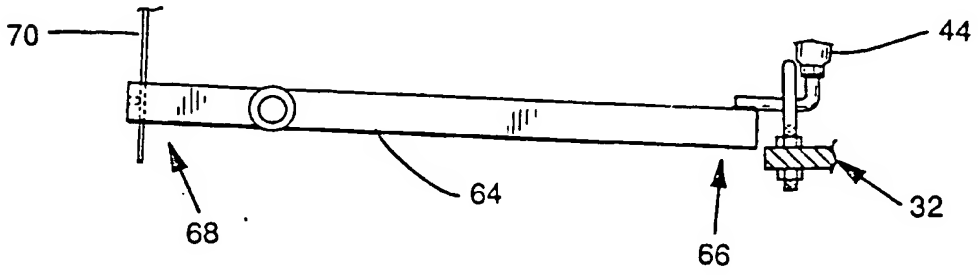

FIG. 9

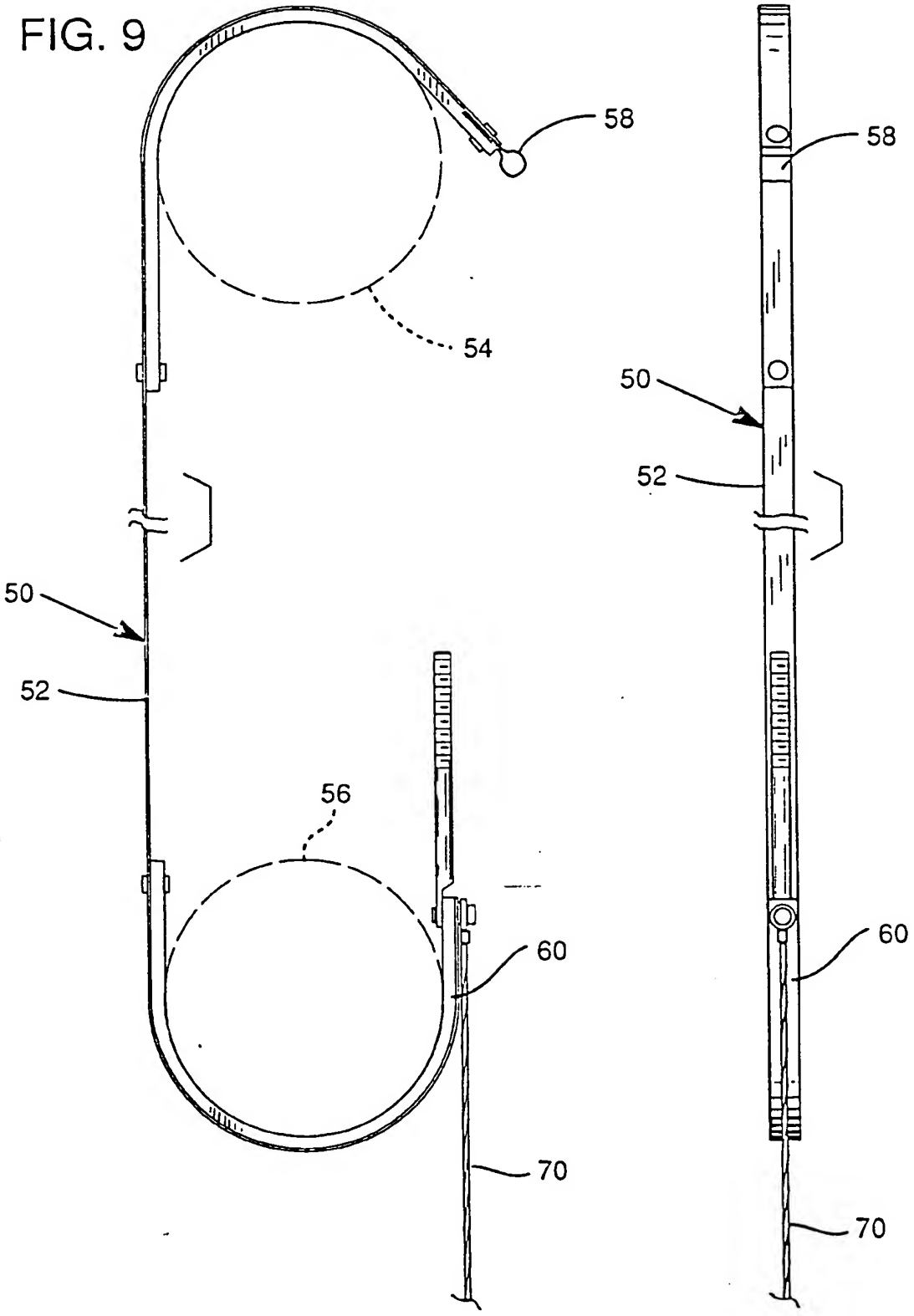

FIG. 10

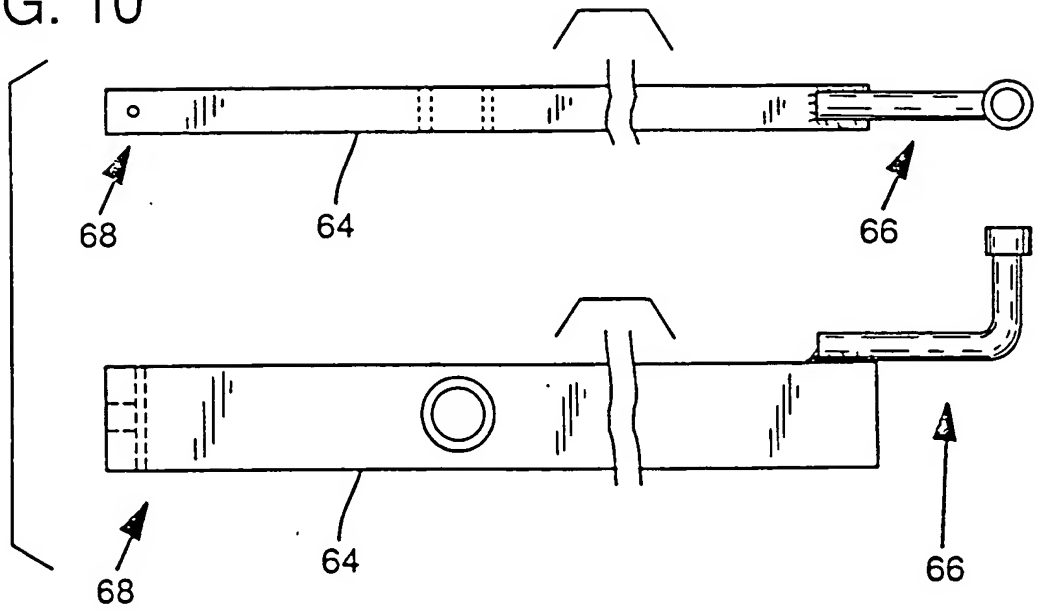


FIG. 11

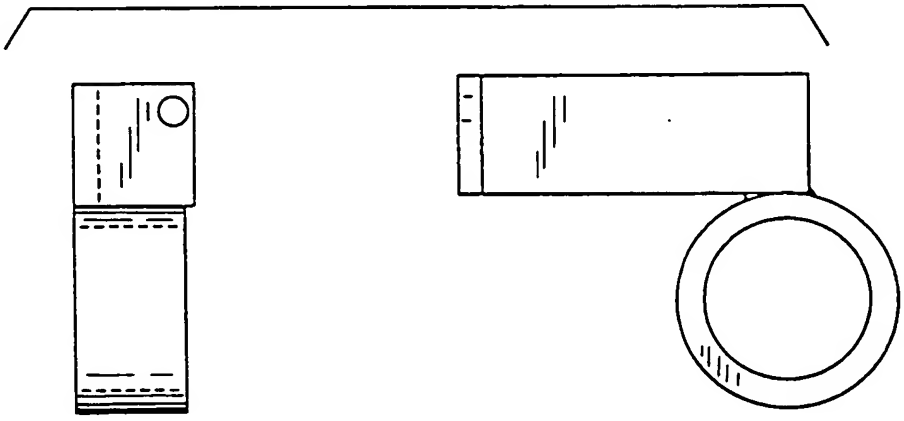

FIG. 12

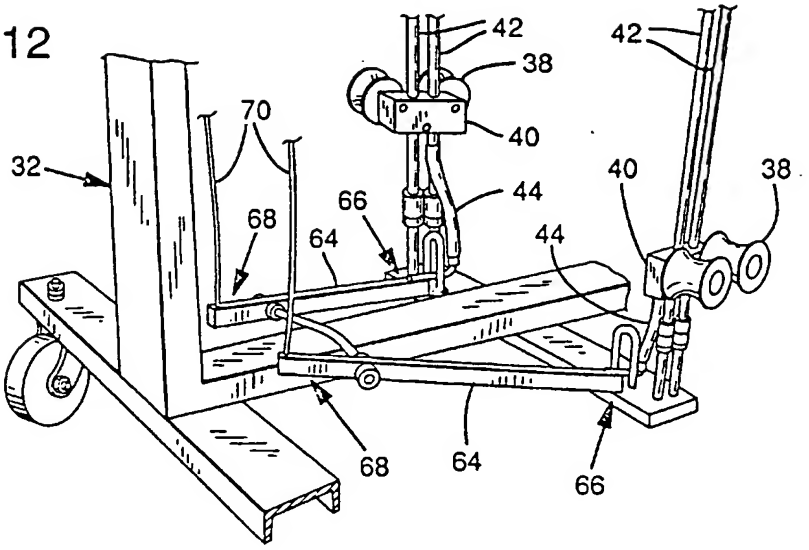
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FIG. 13

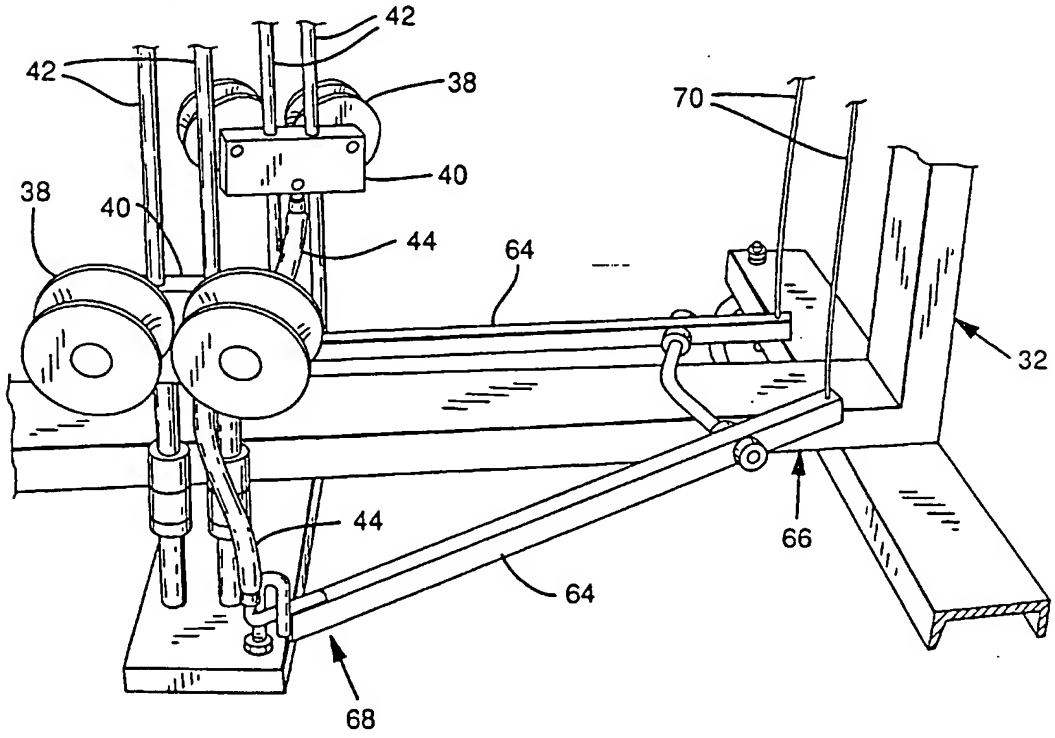
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FIG. 14

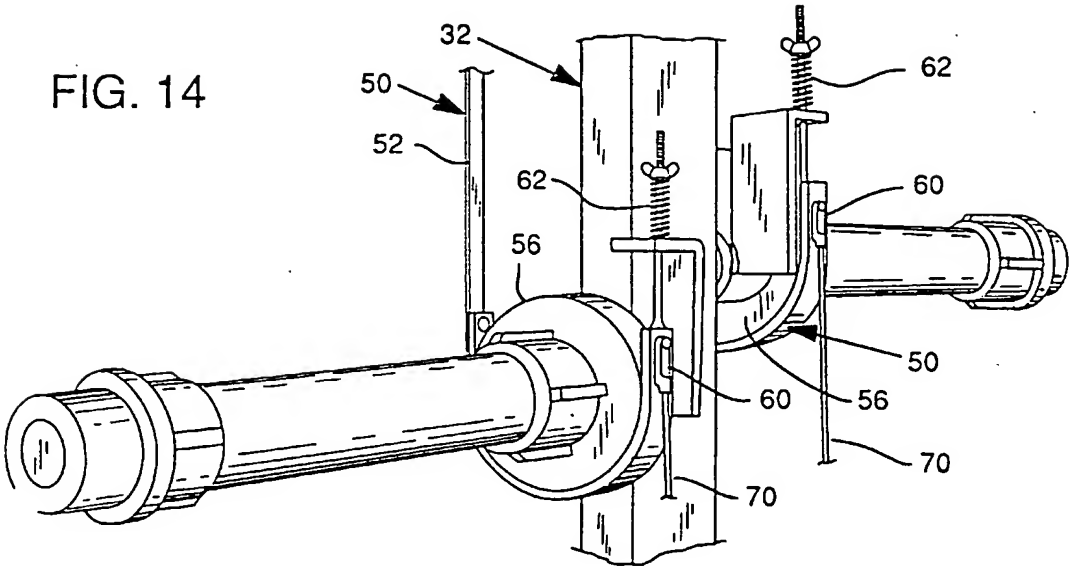
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FIG. 15

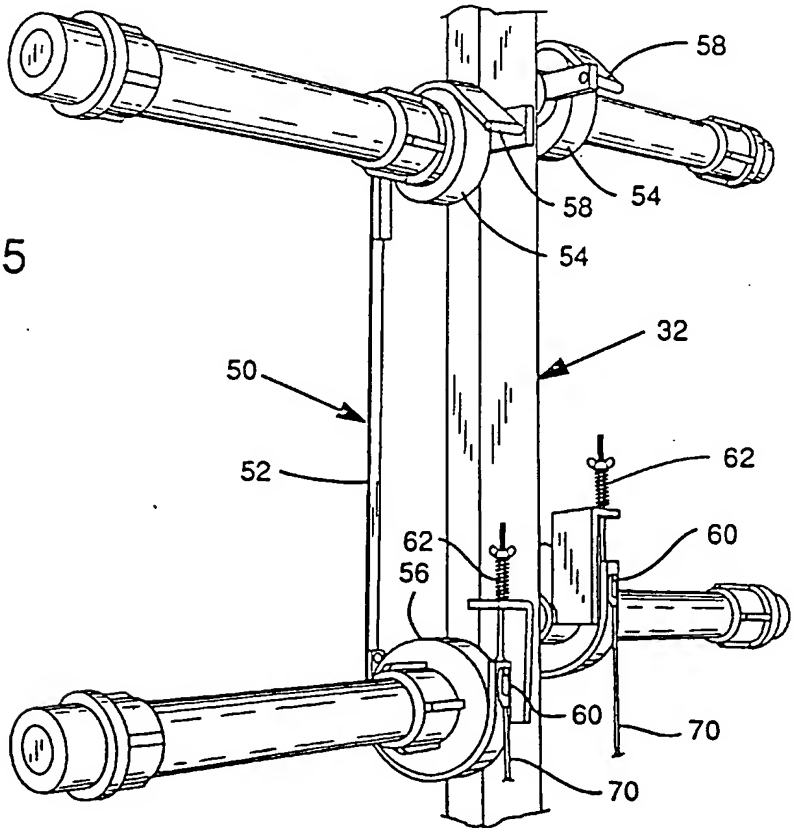
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FIG. 16